Abstract

Colorectal adenomas containing invasive carcinoma represent the majority of early colorectal cancers. The malignant polyp carries a significant risk of lympho-haematogenous metastasis and mortality due to the penetration of cancerous cells into the submucosal layer. The therapeutic dilemma is whether to perform endoscopic or surgical resection. A thorough assessment of the endoscopic, histological and clinical variables is needed to unravel the best treatment for each patient. In particular, a unique staging of such lesions, based on certain histopathological features, has been deeply implicated in the therapeutic choice. Aim of this article is to review the main endoscopic, histological and clinical features of the malignant polyp in order to propose a systematic management of this lesion.

Keywords: Adenoma; Cancer; Colon; Malignant polyp; Management; Polyp

Colorectal cancer (CRC) has become the most common malignancy in Europe with an estimated total of 258,000 new cases in the year 2000, and its high cost of treatment represents a substantial economic burden on European societies [1]. Due to its relatively poor survival – less than 50% at 5 years – CRC accounts for as many as 1 in every 12 cancer-related deaths, being the second cause of cancer-related death in Europe [2]. Due to its natural history, CRC is presumably the most preventable and curable of all human cancers. Indeed, such a disease is characterised by a very long preclinical phase – lasting 10–20 years – in which a detectable benign lesion – the adenomatous polyp – slowly acquires malignant behaviour [3–5]. Besides, long-term survival after CRC removal is mostly related to its staging, being higher than 95% when diagnosed in the earliest stages and less than 40% for the later stages [6].

The malignant polyp – defined as an adenomatous growth containing a focus of transformed cells that has invaded the submucosa – represents the most frequent type of early colorectal cancer in western countries [7,8]. Indeed, although non-polypoid types of early cancers – either flat or depressed – have been consistently described in eastern countries [9], they have been scarcely reported in Europe and the US [10]. Although CRC incidence in western countries has been stable in the last decades, the widespread use of colonoscopy and the evolution of polypectomy and endoscopic mucosal resection techniques have resulted in a relative increase in the incidence of cancerous polyps with a rate of as much as 7–8% per year [11]. Overall, such lesions account on an average for 2% of all polypectomies [7], although figures as high as 11% have been reported [12]. Moreover, nearly 10% of the CRC diagnosed are represented by malignant polyps, which are also the only variety of colon cancers that may be cured by a simple endoscopic approach [8]. The worldwide implementation of colon cancer screening programs is expected to shift further towards the earlier stages the diagnosis of CRC [13,14], so that gastroenterologists may be expected to play...
a major role in the diagnosis and treatment of early CRC in the near future.

From an oncologic point of view, a cancerous polyp represents the irreversible step of transformation – along the adenoma–carcinoma pathway – from a benign to malignant lesion due to the progressive accumulation of those carcinogenic mutations that are also detected in more advanced stages of CRC [15,16]. Such genetic evidence underlines how the cancerous polyp is intrinsically characterised by an aggressive biological phenotype, with the risk of distant metastasis strictly related to staging [17]. Such a risk of metastatic progression poses a therapeutic challenge when deciding to opt for endoscopic or surgical intervention. Although endoscopy is highly effective in removing cancerous polyps down to the submucosal layer of the intestinal wall, it cannot determine whether any residual tumour has been missed deeper in the bowel wall not to mention removing any deeper tissue or involved lymph nodes. On the other hand, surgical intervention enables accurate staging of disease as well as local and relevant lymph node clearance, although this does carry a recognised risk of morbidity and mortality, particularly in the elderly [11]. Moreover, surgery cannot guarantee the prevention of distant metastasis [18].

The basic question is therefore whether the risk of either local recurrence of cancer or prior spread to adjacent nodes is appreciably greater than the risk and long-term efficacy of colectomy.

Unlike all the other varieties of colon cancers, some histological features of the malignant polyp have been claimed to predict the risk of local or distant progression, generating a unique staging of such lesions that has been deeply implicated in therapeutic management [19,20]. Although there is a wide agreement that malignant polyps with favourable histology manifest a good prognosis, several controversies still exist on the clinical application of such criteria, especially when applied to sessile polyps, this is also because of the wide heterogeneity of the literature on this topic [21]. Moreover, when a dedicated pathologist is unavailable, an appropriate definition of the malignant polyp and an exhaustive description of the main histological risk factors may be difficult to obtain, with the frequent consequence of over-treating patients as an emotional reaction to an unexpected finding of ‘cancer’ after polypectomy, on one hand, or to avoid legal complications, on the other [22].

Taking these considerations altogether, the malignant polyp is an even more frequent dilemma for the endoscopist and the patient to deal with, due to the potential aggressive character of the cancer, on one hand, and the never-ending doubts shadowing the adequacy of polypectomy alone as curative treatment, on the other.

Ultimately, the therapeutic choice will involve a complex process, which relies heavily on the endoscopic and histological features of the lesions, as well as on the clinical characteristics and expectations of the patient. For these reasons it seems appropriate to offer a brief commentary on the current state of the endoscopic and histological diagnoses of the malignant polyp in relation to its treatment.

1. Endoscopy

Although firm criteria to differentiate between benign and cancerous polyps have not been described, the endoscopist should be alert to some features that are suggestive of possible malignancy and that may heavily affect endoscopic management. Such features include the presence of depressed ulceration, irregular contour, deformity, a short and immobile stalk and the inability to elevate a sessile polyp upon submucosal bleb formation [2,23]. Attempts at diagnosis in these suspicious lesions – as well as in flat or depressed lesions – can be carried out using chromoendoscopy and magnification techniques that can highlight abnormalities of glandular cytoarchitecture, while also allowing an insight into the extent of submucosal invasion [24–27]. Kudo et al. [28] developed the pit pattern classification for colon polyps with six classes of surface pattern depicted by magnifying endoscopy after indigo carmine staining. Class 5 of pit-pattern classification or an unstructured surface has been shown to correlate well with a diagnosis of malignancy, and can provide important additional information prior to endoscopic treatment. In addition, endoscopic ultrasound using high frequency transendoscopic miniprobes currently appears to be the most accurate method for defining submucosal or further bowel wall invasion, enabling direct referral for surgical intervention in those cases with deeper infiltration who are at greater risk of lymphatic spread [29].

Although the diagnosis of malignancy is ultimately histological, the extent of excision by endoscopic polypectomy is essential to permit the subsequent diagnosis of malignancy by the pathologist [30]. For pedunculated polyps, it is essential to send a sample of tissue including the base of the stalk – especially if its upper part appears swollen and indurated – so as to best demonstrate any possible infiltrative extension of cancerous cells, offering the histopathologist a chance of defining accurately the lower limit of invasion. As far as small sessile lesions are regarded, a careful, complete removal and retrieval is paramount as malignant lesions of less than 5 mm diameter are well recognised—being more frequent in the rectum than in the remaining colon [31]. Of note, in as many as 50% of cases, malignant polyps are less than 2 cm [12]. A simple forceps biopsy of such lesions should be avoided because it does not yield sufficient information as to whether malignant cells have penetrated through the muscularis mucosae. Similar caution must also be exercised when removing flat or depressed lesions (types Ilb and IIC of the Paris classification [32]) that tend to infiltrate the submucosal layer when they are still small [33].

The technique of removal is also important for large sessile polyps. Removal en bloc of this type of polyp is the preferred method insomuch as it permits polyp orientation to be maintained thereby optimising histological examina-
tion for meaningful evaluation of neoplastic extension and invasion [34]. It usually involves a submucosal preinjection of saline or 1:10.000 adrenaline solution that separates the lesion from the muscular coat, resulting in a ‘safety cushion effect’ that allows the endoscopist safer snare transaction and the histopathologist an easier assessment of the single specimen. In contrast, such information is often lost when a lesion is removed piecemeal. For such a reason, it seems logical to avoid piecemeal removal at any time when surgery appears inevitable – i.e. incomplete lifting of a sessile polyp upon submucosal bleb – in order to avoid running any risk of complications such as bleeding or perforation. In such cases, a partial snare biopsy specimen and a tattoo injection may be the sufficient bridge to surgery [22]. The latter is particularly indicated for large or possibly malignant polyps in the rectum, in which proctologists may easily employ two-handed micro-surgical techniques to en bloc remove the polyp. Wherever piecemeal removal cannot be avoided, it is a good practice to perform submucosal injection with bleb formation prior to endoscopic polyp extraction. The aim is to better define the site to be removed, to obtain larger, deeper fragments (thereby reducing the number of pieces needed to be removed) and also to aid in sample orientation at the time of fixing. Furthermore, treatment with laser or APC can be performed on the remaining margins and base (even if apparently clear both at endoscopy and histology) in order to further reduce the risk of local recurrence, whereas chromoendoscopy may be useful to better delineate the exact borders of the lesion [35]. Finally, it is always pertinent to inform the pathologist should any suspicion of incomplete removal remain.

The importance of a meticulous approach to piecemeal removal cannot be overemphasised and derives from the fact that around one-third of malignant polyps are removed in this manner [36]. With fragmented removal, the certainty of the histological evaluation as far as completeness of removal or extension of any invasive focus becomes critical. In the near future, treatment and histological diagnosis may be revolutionised with endoscopic techniques allowing full thickness removal of polyoid lesions [37].

After the polypectomy of a malignant lesion, a strict endoscopic follow-up is recommended to check for residual tissue at the polypectomy site, and local toattooing may be useful for this purpose. For such a reason all patients should have an early follow-up endoscopy within 3 months [38]. If the results of this early follow-up examination are negative, subsequent surveillance is identical to that practiced for patients with non-malignant adenomas, since there is no evidence that such patients are at higher risk of metachronous polyps or cancers than those patients with a benign adenoma [39].

2. Histology

According to the recognized adenoma–carcinoma sequence, colorectal neoplasia is a single, indivisible continuum that begins within the mucosa as mild epithelial dysplasia and can progress through dysplasia of increasing severity until finally invasion across the muscularis mucosae occurs, at which time the term carcinoma applies [40]. Due to the absence of lymphatic vessels in the mucosal layer, the intramucosal neoplasia behaves like a benign adenoma [41]. For this reason, polyps harbouring ‘in situ’ or ‘intramucosal’ cancer should not be regarded or treated as ‘malignant’ polyps [42]. Any of these terms should be interpreted as an indication that the polyp is biologically a benign adenoma and should be considered as any other endoscopically resected benign polyps [22]. Indeed, the definition of ‘malignant’ polyp implies the penetration of cancer cells – beyond the muscularis mucosae – into the submucosa, whether into the stroma of the head or stalk of the polyp or into the submucosa under a sessile lesion (Fig. 1). Invasion of the submucosa, in fact, opens the way to metastasis via the lymphatic and blood vessels (Fig. 2) [43]. In diagnosing submucosal malignant infiltration, the pathologist needs to rule out the confusing phenomenon of ‘misplaced’ epithelium or ‘pseudo-invasion’ in which, secondary to traumatisation, local infarction or internal bleeding in the polyp head, otherwise normal mucosa, can regenerate or become trapped within the stroma of the polyp head, mimicking a true invasion from malignant cells [44,45]. When the cancerous tissue further extends, beyond the submucosa, into the muscularis propria, the lesion is then defined as a polyoid carcinoma, necessarily requiring surgery for a radical removal.

For a rigorous histological diagnosis, several criteria must be satisfied including (1) optimal technical processing (preparation, orientation and number of congruous sections), (2) an accurate sample description, (3) a thorough definition of the main histological risk factors and finally (4) a therapeutic-oriented conclusion.

Regarding technical processing, scrupulous orientation of the excised polyp is essential so that once the pathologist

![Fig. 1. Macroscopic appearance of a malignant polyp. The malignant component invades the submucosa of the head of the polyp, corresponding to an ulcer on its surface (arrow).](Image)
has identified the stalk or the diathermy burn for a sessile growth, polyps may be trimmed on the correct longitudinal plane and embedded in two blocks [19]. At this point, at least three-step sections from each block need to be cut and stained with haematoxylin and eosin. This is particularly important to carefully assess the irregular front line of the infiltrative cancer as compared with the endoscopic transaction line in order to assess whether the polypectomy has radically removed the submucosal cancer or if a residual of the malignancy may be present deeper in the bowel wall [46].

It was back in 1966 that Morson discovered a possible association between some histological features of the malignant polyp and the risk of lymph node metastasis [47]. After 40 years, most of his observations are still universally applied. It is therefore essential that the pathologist ensures a thorough description as to the presence, absence or uncertainty of those recognised prognostic factors that will ultimately have an impact on the management of the patient. Some of the more important factors suggestive of poor outcome include the finding of cancer at the margin of resection, the presence of poorly differentiated cells in the cancerous areas and the evidence of lymphatic or vascular invasion [20,48–50]. More recently, following the introduction of endoscopic mucosal resection for sessile or flat lesions, Japanese pathologists have proposed an additional histological classification system based on the grade of cell differentiation at the lesion margins and on the size and depth of invasion of the submucosa [51,52]. In particular, the degree of submucosal invasion is classified into three types based on the depth of invasion. When less than one-third of the submucosa is invaded the stage is sm1 and if more than two-thirds is invaded the stage is sm3, whereas stage sm2 is intermediate. It was shown that penetration of cancerous cells into the lower third of the submucosa (sm3) of sessile lesions was associated with a greater risk of lymphatic spread than only an initial penetration (sm1) [52].

Due to the major role of histology in the diagnosis and prognosis of patients with malignant polyps, a high concordance amongst pathologists would be desirable. Unfortunately, the intra- and inter-observer variability in the interpretation of received samples amongst even the most expert histopathologists can be high and often lead to diagnostic uncertainties which inevitably result in a more cautious therapeutic approach being taken [53]. It should be also emphasised that a lack of understanding of current histological terminology can lead to inappropriate decision making such as surgical intervention performed on a substantial number of cases with a diagnosis of intramucosal carcinoma [11]. Wide interobserver variation has been recently shown in the diagnosis of malignant polyps between experienced and more junior pathologists, underlining the importance of a dedicated pathologist in this field [54]. Moreover, methodological discrepancies on the concept of cancer differentiate Japanese from Western pathologists. In Japan, CRC is mainly diagnosed on the basis of nuclear characteristics and features of the glandular structure, whilst the western pathologist considers the presence of evident invasion into the submucosal layer mandatory for the diagnosis of cancer [10,55]. This undermines a meaningful comparison among the different series in both the clinical and research fields, although new attempts of classification – i.e. Vienna classification – have been advanced to overcome these discrepancies [56]. On the other hand, a high inter-observer concordance has been shown in the pathological identification of the three major histological risk factors, namely invasion of cancer at the margin of resection, grade of differentiation and vascular infiltration [53].

### 3. Clinical

The diagnosis of a malignant polyp has important implications for the patient in terms of treatment, risk of recurrence, development of metastases, surgical complications and survival. The patient would rightly deserve answers based on multicentre, prospective, randomised, controlled trials with sufficient follow-up as it typically occurs in an oncological setting. Unfortunately, this is not the case for malignant polyps. Most of the studies available in the literature are retrospective, often monocentric and not unusually focusing selectively on either a gastroenterological, pathological, or surgical point of view. Some findings are, however, common to the vast majority of these studies. In particular, a strong association between the absence of the described histological risk factors and a good prognosis in term of local and distant metastasis after polypectomy has been extensively
reported [18–29,43,46,48–53,57–71]. For such reasons, cancerous polyps where the resection margin is clear of cancerous tissue, a good differentiation grade is present, and there is no obvious evidence of vascular infiltration, are usually regarded as ‘low-risk’, accounting for 30–40% of malignant polyps overall [20]. Conversely, lack of one or more of the abovementioned characteristics – a ‘high-risk’ polyp – implies a less favourable prognosis in terms of both local and distant disease. The main problem is whether complete polypectomy is an adequate treatment for all the low-risk lesions. It has been suggested that endoscopic treatment may be sufficient for low-risk sessile lesions, provided that a scrupulous pathological examination can be performed [38]. However, several authors prudentially recommend surgery at least for those patients with a sessile low-risk polyp who are under age 50 [22,38]. Indeed, in these young subjects, the surgical mortality is so low that a decisional study based on the above-mentioned variables has shown the benefit of surgery over polypectomy [77]. Moreover, it should be remembered that only a small minority of patients with malignant polyps were diagnosed with a sessile low-risk lesion in an age younger than 50 years, so that the literature on this topic is limited to very few cases and a cautious approach seems prudent.

The second question is whether sessile morphology should justify a more aggressive approach even when dealing with low-risk polyps. It has been suggested that the pedicle may act as a ‘buffer zone’ representing a physiological barrier to the spread of malignant cells into the submucosa of the colon that is missing in the case of sessile morphology [38]. Moreover, complete endoscopic resection and its careful assessment is more difficult to achieve in the case of sessile growths than those pedunculated, and larger lesions often require piecemeal removal thereby disrupting cytoarchitecture and making a meaningful histological interpretation more uncertain. As already stated, there is also evidence that deep infiltration of the malignancy into the submucosa (sm2–sm3) of sessile lesions is associated with a higher risk of node metastasis [52]. Furthermore, previous series showed a higher risk of residual tumour or lymph node metastasis in low-risk sessile lesions [75,76]. In such series, on the contrary, cases in which the three main risk factors were not simultaneously described have also been included. Excluding such cases, there is actually no evidence for low-risk sessile polyps to offer a worse prognosis than pedunculated polyps, being the rate of lymph node repetition of 0% [72,74]. For such a reason, it has been suggested that endoscopic treatment may be sufficient for low-risk sessile lesions, provided that a scrupulous pathological examination can be performed [38].

The third dilemma is whether surgery is necessarily indicated in all cases of high-risk polyps, and if each of the main histological risk factors has an equivalent prognostic importance. There is no doubt that surgery is essential to locally treat the high-risk polyp since residual cancer or lymph node spread have been detected in up to 30–40% of malignant polyps with at least one unfavourable histological characteristic (Table 1) [72]. However, despite often resorting to surgery in those patients with high-risk cancerous polyps, mortality remains high mainly due to the appearance of distant metastases that may be identified several years after the operation [72]. Surgical resection may reduce mortality for high-risk polyps from 10% to 6% but this is still far from the survival rates seen in those groups of patients with low-risk cancerous polyps (Table 2). Such a risk must be compared to the risk of death from abdominal surgery. A carefully designed study has evaluated the risk of perioperative mortality in an elective surgery setting as 1.6% for patients below 65 years and 4.4% for those over 70 [78]. However, in a large epidemiological study a mortality rate for surgical removal of malignant polyps as high as 8.2% has been reported [11]. Moreover, it is

Table 1
Reported studies in which the risk of lymph node metastasis was assessed in patients with low- and high-risk polyps who underwent surgical resection

<table>
<thead>
<tr>
<th>Author (ref.)</th>
<th>Low-risk polyps, n</th>
<th>Lymph node metastasis, n (%)</th>
<th>High-risk polyps, n</th>
<th>Lymph node metastasis, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colacchio et al. [73]</td>
<td>19</td>
<td>4 (21.1)</td>
<td>5</td>
<td>2 (40)</td>
</tr>
<tr>
<td>Cranley et al. [19]</td>
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<td>0</td>
<td>16</td>
<td>3 (18.8)</td>
</tr>
<tr>
<td>Christie [63]</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Muller et al. [49]</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>3 (17.6)</td>
</tr>
<tr>
<td>Coverlizza et al. [64]</td>
<td>4</td>
<td>0</td>
<td>14</td>
<td>5 (35.7)</td>
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<tr>
<td>Sugihara et al. [67]</td>
<td>8</td>
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<td>8</td>
<td>1 (12.5)</td>
</tr>
<tr>
<td>Geraghty et al. [80]</td>
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<td>0</td>
<td>9</td>
<td>1 (11.1)</td>
</tr>
<tr>
<td>Kyzer et al. [60]</td>
<td>11</td>
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<td>18</td>
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<tr>
<td>Hackelsberg et al. [57]</td>
<td>4</td>
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<td>41</td>
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<tr>
<td>Whitlow et al. [71]</td>
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<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Netzer et al. [20]</td>
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<td>0</td>
<td>7</td>
<td>1 (14.3)</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>4 (5)</td>
<td>178</td>
<td>20 (11.2)</td>
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Table 2
Reported studies in which mortality of high-risk polyps was related to therapy

<table>
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<tr>
<th>Author (ref.)</th>
<th>High-risk polyps</th>
<th>Surgically treated, n</th>
<th>Death, n (%)</th>
<th>Not surgically treated, n</th>
<th>Death, n (%)</th>
</tr>
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<tr>
<td>Morson et al. [43]</td>
<td></td>
<td>41</td>
<td>2 (4.9)</td>
<td>10</td>
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<tr>
<td>Richards et al. [61]</td>
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<td>9</td>
<td>3 (33.3)</td>
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<tr>
<td>Cranley et al. [19]</td>
<td></td>
<td>17</td>
<td>1 (5.9)</td>
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<td>Muller et al. [49]</td>
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<td>Geraghty et al. [80]</td>
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<td>14</td>
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<td>–</td>
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<tr>
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<td>31</td>
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<tr>
<td>Kitamura et al. [65]</td>
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<td>0</td>
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<tr>
<td>Park et al. [52]</td>
<td></td>
<td>24</td>
<td>2 (8.3)</td>
<td>14</td>
<td>1 (7.1)</td>
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<tr>
<td>Christie [63]</td>
<td></td>
<td>16</td>
<td>3 (18.8)</td>
<td>9</td>
<td>3 (33.3)</td>
</tr>
<tr>
<td>Kitamura et al. [65]</td>
<td></td>
<td>8</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>199</td>
<td>11 (5.5)</td>
<td>95</td>
<td>10 (10.5)</td>
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</table>

worth pointing out that the patient is similarly exposed to the perioperative risks regardless of the success of the curative surgery and also when the surgical specimen fails to show any residual foci, which may occur in up to 70% of cases. This should serve as a warning before hastening patients at high-risk for surgery to the operating room, especially if we take into consideration that more aggressive endoscopic therapies, such as laser or mucosectomy [34], were scarcely applied in the available series.

Regarding the relative importance of the risk factors, a positive resection margin is the most frequently assessed and it is generally regarded as the most powerful prognostic factor. Indeed, residual disease and distant metastasis have been described in up to 46% and 16% of the cases with a positive margin, respectively [72]. Unfortunately, it is still unclear what distance from the resection margin is sufficient to guarantee complete resection. To this question, opinion is divided and theories range from simply observing a healthy margin to an existing need of at least 1, 2 or 3 mm between margin and cancerous focus [38,79]. A gap of at least 2 mm seems cautiously prudential. As far as differentiation is concerned, a poor grade of differentiation is seen in 5.7–10% of cases [72]. The meaning of this finding, taken in isolation, is however unclear. Some authors have failed to find unfavourable events in patients for whom this was the sole negative finding unless of course the resection margin was involved [48]. On the contrary, a dismal prognosis despite radical surgery for patients with a poor degree of differentiation has been highlighted by our recent pooled data analysis as well as by other authors [19,46,72]. Further studies are needed to clarify this issue. Over the years, evaluation of lympho-hematic infiltration as an independent risk factor has taken a less prominent role. This is perhaps due to the fact that it is a relatively rare finding (on average seen in 15.6% of cases) and interpretation can be difficult due to compounding shrinkage artefact in prepared sections. Furthermore, it is rarely seen in isolation—generally being associated with other unfavourable histological findings. In our recent pooled-data analysis, no significant differences in terms of clinical outcome were found pooling low-risk malignant adenomas with those with only vascular invasion as a risk factor [72]. Such observation strengthens the previous suggestion that the isolated presence of this risk factor has a weak predictive importance and should be probably downgraded [80].

4. Conclusions

Clinical management of the malignant polyp is one of the most challenging dilemmas in gastroenterology. A thorough knowledge of the various endoscopic, histological and clinical variables is needed in order to unravel the best treatment for each patient. When dealing with early cancer, it should always be emphasised that a conservative endoscopic approach may only be considered if there is meticulous certainty as to the adequacy of both the endoscopic resection and the histological examination with a clear definition of the main risk factors. With this evidence in mind, the four following points of guidance are proposed (Fig. 3):

1. Adenomas that contain either high-grade dysplasia, carcinoma in situ or superficial carcinoma without evidence of submucosal malignant infiltration must not be considered as malignant polyps since there is no risk of metastatic potential once the polyp has been removed. Complete endoscopic removal is sufficient.
2. In patients with pedunculated malignant polyps with favourable histological characteristics careful endoscopic removal is sufficient, although a strict endoscopic and clinical follow-up is to be cautiously advised.
3. As far as sessile polyps with similar favourable histology, if the patient is young and in good health, surgery should be advised. However, if the patient is elderly and at high perioperative risk a more conservative approach with regular endoscopic follow up may be suggested.
4. Patients with high-risk polyps should be treated with surgery, unless a high-surgical risk is also present.

**Practice points**
- The malignant polyp is the most frequent variety of early CRC in western countries.
- Malignant polyps are classified as low- and high-risk according to 3 histological features (resection margin, grade of differentiation, lympho-vascular invasion)
- Infiltration of the resection margin and poor differentiation are strongly associated with residual disease and mortality, respectively, whilst the role of lympho-vascular invasion has been marginalized.
- Complete endoscopic treatment is adequate for low-risk, pedunculated lesions, and low-risk sessile lesions in >60 years patients, whilst surgery is needed in the remaining cases, unless patients are at high risk for surgery.

**Research agenda**
- Identification of molecular markers associated with metastatic risk.
- Evaluation of the role of endoscopic mucosal resection in the management of large, low-risk, sessile malignant polyps.
- Assessment of risk/benefit ratio for minimally invasive surgery as compared to endoscopy in patients at increased surgical risk.

**Conflict of interest statement**
None declared.

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**References**


